

Hydrological Modeling, Change Detection, and Scenario Testing with the Automated Geospatial Watershed Assessment Tool

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Key Words: hydrologic process modeling, Geographic Information Systems, watershed runoff, assessment, land-use planning

Planning and assessment in land and water resource management are evolving toward complex, spatially explicit regional assessments. These problems have to be addressed with distributed models that can compute runoff and erosion at different spatial and temporal scales. The extensive data requirements and the difficult task of building input parameter files, however, have long been an obstacle to the timely and cost-effective use of such complex models by resource managers. The U.S. EPA Landscape Ecology Branch, in collaboration with the USDA-ARS Southwest Watershed Research Center, has developed a geographic information system (GIS) tool to facilitate this process. A GIS provides the framework within which spatially distributed data are collected and used to prepare model input files, and model results are evaluated.

The Automated Geospatial Watershed Assessment (AGWA) tool uses widely available standardized spatial datasets that can be obtained via the Internet at no cost to the user. The data are used to develop input parameter files for KINEROS2 and SWAT, two watershed runoff and erosion simulation models that operate at different spatial and temporal scales. AGWA automates the process of transforming digital data into simulation model results and provides a visualization tool to help the user interpret results. Results from multiple simulations can be compared for the purpose of detecting hydrologic response to landscape or climate change. Land-use planning is facilitated by the comparison of results from simulations based on forecasted future scenarios. The utility of AGWA in joint hydrologic and ecological investigations has been demonstrated on such diverse landscapes as southeastern Arizona, southern Nevada, central Colorado, northwest Oregon, and upstate New York.

Notice: The U.S. Environmental Protection Agency (EPA), through its Office of Research and Development (ORD), funded this research and approved this abstract as a basis for an oral presentation, poster, or demonstration. The actual presentation has not been peer-reviewed by EPA.